


County of Loudoun

Department of Transportation and Capital Infrastructure

MEMORANDUM

DATE: September 30, 2013

TO: Evan Harlow, Project Manager
Department of Planning

FROM: Arkopal Goswami, Senior Transportation Planner 
Transportation Division

**SUBJECT: ZMAP 2012-0011 – Tuscarora Crossing
Third Referral**

Background

This referral updates the status of comments noted in the first and second Department of Transportation and Capital Infrastructure (DTCI) referrals on this rezoning (ZMAP) application, dated December 6, 2012 and April 4, 2013. This application seeks to rezone approximately 250 acres of land from Planned Development – General Industry (PD-GI) to Planned Development – Housing (PD-H3), Planned Development – Commercial Center – Neighborhood Center (PD-CC(NC)), and Planned Development – Industrial Park (PD-IP) in order to allow 312 single family detached units, 265 townhouse units, up to 23,000 sq. ft. of commercial/retail uses, and up to 718,000 sq. ft. of commercial/industrial uses. In addition, the Applicant also proposes a 15-acre land bay for public use, such as an elementary school.¹ The property is located along the future planned alignment of Crosstrail Boulevard (VA Route 653 Relocated), south of Russell Branch Parkway, and northeast of future Kincaid Boulevard Extended. Access to the property will be provided via four access points along future Crosstrail Boulevard.

This update is based on DTCI's review of materials received from the Department of Planning on August 23, 2013, including (1) an information sheet, dated August 21, 2013; (2) a statement of justification prepared by the Applicant, dated March 5, 2013 revised through August 16, 2013; (3) a draft proffer statement prepared by Applicant, dated March 5, 2013 and revised through August 16, 2013; (4) a traffic study prepared by Wells & Associates, Inc., dated February 1, 2013 revised through August 13, 2013; and (5) a zoning map amendment plat

¹ This development program differs from the first and second submissions. In the first submission the Applicant had proposed to rezone from PD-GI to PD-H4 in order to allow 453 single family detached and 344 townhouse units. In the second submission the Applicant had proposed to rezone from PD-GI to PD-H3 in order to allow 367 single family detached, 353 townhouse units, and up to 23,000 sq. ft. of commercial/retail uses.

prepared by Bowman Consulting Group, Ltd., dated July 9, 2012 revised through August 16, 2013.

Review of Applicant's Revised Traffic Study

A revised traffic study (dated August 13, 2013) was submitted by the Applicant. There are no changes to the existing (2012) and background (2018 and 2028) conditions. The traffic study assumptions regarding the roadway network in 2018 and 2028 (i.e. construction of Crosstrail Boulevard, Trailview Boulevard, Miller Drive, and Russell Branch Parkway) also remain the same. The only changes in the study, primarily due to the revised development program, are to the trip generation and distribution analyses, and the subsequent analysis of the future (2018 and 2028) with development condition. Described in the section below are these changes.

Trip Generation and Distribution from Proposed Development

Table 1 below shows the trips generated by the proposed (revised) development during the weekday commuter morning and afternoon peak hours. Combined, the proposed uses would generate a total of 1,601 morning peak hour trips, 1,477 afternoon peak hour trips, and 12,163 daily trips.

Table 1. Comparison of Trips Generated between Proposed and Approved Use

| Land Use | Size | Units | Total Generated Trips | | | | | | Average Daily Traffic |
|---------------------------------------|-------|----------|-----------------------|-----|--------|--------------|--------|--------|-----------------------|
| | | | AM Peak Hour | | | PM Peak Hour | | | |
| | | | In | Out | Total | In | Out | Total | |
| Proposed Uses | | | | | | | | | |
| 2018 – Landbays 1, 2, 4, and 5 | | | | | | | | | |
| Single Family | 312 | DU | 57 | 171 | 228 | 185 | 108 | 293 | 2,992 |
| Town Homes | 265 | DU | 19 | 94 | 113 | 90 | 44 | 134 | 1,502 |
| Elementary School | 600 | Students | 149 | 121 | 270 | 44 | 46 | 90 | 774 |
| Specialty Retail Center | 23 | kSF | 40 | 24 | 64 | 34 | 43 | 77 | 1,022 |
| 2028 – Landbay 3 | | | | | | | | | |
| General Office | 718 | kSF | 815 | 111 | 926 | 150 | 733 | 883 | 5,873 |
| Total Proposed – 2018 & 2028 Combined | | | 1,080 | 521 | 1,601 | 503 | 974 | 1,477 | 12,163 |
| Approved Uses | | | | | | | | | |
| Light Industrial | 1,469 | kSF | 1,189 | 162 | 1,351 | 173 | 1,266 | 1,439 | 10,238 |
| Office | 1,411 | kSF | 1,372 | 187 | 1,559 | 282 | 1,377 | 1,659 | 9,815 |
| Comparison (Proposed – Approved Uses) | | | -1,697 | 23 | -1,674 | -28 | -1,746 | -1,774 | -9,686 |

Source: Wells & Associates Inc., Tuscarora Crossing Traffic Impact Study, dated 8/13/13.

In addition, the table also compared the trips that could be generated from the approved flex-industrial (office and light industrial) uses to the trips that would be generated from the proposed residential uses. The study indicates that the proposed residential uses will generate

1,674 fewer AM peak hour trips, 1,774 fewer PM peak hour trips, and 9,686 fewer daily trips than the approved flex-industrial uses.

Attachments 1 & 2 (Figure 5-1, Figure 5-2) illustrate the trip distribution percentages as a result of the proposed development in 2018 and 2028 respectively. This distribution is broken down by use (i.e. residential, retail, and school).

Forecasted Traffic Volumes (2018 & 2028), and Level of Service (LOS) with Proposed Development

Attachments 3 - 7 (Figure 6-1, Figure 6-2, Figure 6-3, Figure 6-4, and Table 6-1) illustrate the Future (2018 and 2028) Conditions with Development (background plus site generated traffic) analysis, depicting the traffic volumes and intersection LOS. The study indicates that with the following future improvements in place, all approaches and intersections analyzed are forecast to operate at acceptable conditions (LOS D or better):

- Construction of a four-lane section of Crosstrail Boulevard between Dulles Greenway and Russell Branch Parkway (2028)
- Signal installation at Crosstrail Boulevard and Trailview Boulevard/North Mid-Site Driveway (Intersection #4) under future 2028 with development conditions
- Signal installation at Crosstrail Boulevard and South Mid-Site Driveway (Intersection #8) under future 2028 with development conditions

Transportation Comments and Recommendations

Staff comments from the first and second DTCl referrals (dated December 6, 2012 and April 4, 2013 respectively), as well as the Applicant's responses (quoted directly from the Applicant's August 16, 2013 response letter) and comment status, are provided below.

1. Initial Staff Comment (1st Referral): As per the 2010 CTP, Trailview Boulevard is planned to be a four-lane controlled access median divided major collector (U4M), within a 90-foot ROW. OTS acknowledges that the need for Trailview Boulevard (west of Crosstrail Boulevard) is driven by the existing planned land use (i.e., needed to support planned non-residential uses on site). As such, OTS recommends that the Applicant revise the traffic study to include a scenario depicting the future "2028 Conditions with Development" with the Trailview Boulevard connection between Crosstrail Boulevard and Keystone Drive. This analysis, combined with the analysis currently shown in the traffic study ("2028 Conditions with Development" without the Trailview Boulevard connection between Crosstrail Boulevard and Keystone Drive) will demonstrate the need for Trailview Boulevard, and could support the removal of this planned roadway from the CTP in the future.

Applicant's Response (March 5, 2013): *The traffic study demonstrates that the anticipated traffic from the proposed development will be adequately served by Crosstrail Boulevard alone. We note the OTS acknowledges that the need for Trailview Boulevard is due to the existing planned non-residential uses on the Property. The approval of this rezoning*

application will eliminate the planned high traffic generating uses that are the reason for the referenced portion of Trailview Boulevard.

Comment Status (2nd Referral): Any amendment to the CTP that might be needed to eliminate the aforementioned section of Trailview Boulevard will require supporting documentation. The scenario analysis as mentioned in the 1st referral comment would demonstrate the need for this roadway or lack thereof. As such DTCI reiterates that the Applicant conduct the scenario analysis and revise the traffic study. Upon review of this analysis, DTCI may have further comments regarding Trailview Boulevard.

Applicant's Response (August 16, 2013): *The requested analysis is being performed and will be provided upon completion.*

Comment Status: Upon receiving the analysis, DTCI will provide further comments.

2. **Initial Staff Comment (1st Referral):** The development program as presented in the Applicant's information sheet as well as the plat (453 single family detached and 344 townhome units) differs from the development program analyzed in the traffic study (469 single family detached homes and 328 townhomes). The Applicant should clarify the proposed development program, and revise the traffic study if needed.

Applicant's Response (March 5, 2013): *An updated development program of 720 lots (367 SFD and 353 SFA) has been incorporated in the revised traffic study and is included on the CDP.*

Comment Status: Comment previously addressed.

3. **Initial Staff Comment (1st Referral):** As per the 2010 CTP, Crosstrail Boulevard in its ultimate condition is planned to be a six-lane controlled access median divided urban major collector (U6M), within a 120-foot ROW, with additional ROW for turn lanes and bicycle/pedestrian facilities, as required. As such, the Applicant should revise the plat and depict the necessary ROW for this roadway. In addition, the Applicant should also commit to dedication of this ROW for Crosstrail Boulevard to the County upon request at no public cost.

Furthermore, OTS recommends that the Applicant coordinate the construction of Crosstrail Boulevard with the County project that is currently being designed. As such, the Applicant should commit to construct the following:

- a) **Initial Staff Comment (1st Referral):** Two-lane section of Crosstrail Boulevard (ultimate westbound lanes) within the site.

Applicant's Response (March 5, 2013): *A two-lane Crosstrail Boulevard within the Property is provided in Proffer IV.A.2.*

Comment Status (2nd Referral): DTCL recommends that the Applicant commit to bond or construct a two-lane section of Crosstrail Boulevard by first record plat/site plan, such that it is open to traffic by first occupancy permit. This facility is essential as it provides access to the proposed development. Alternatively, the Applicant should either provide alternate access points, or phase the development in a manner so as to tie it to the construction of the County's Crosstrail Boulevard project (i.e., two of the ultimate eastbound lanes and a four-lane bridge over Tuscarora creek), which is included in the Capital Improvement Program (CIP) for FY 2018. This is to ensure that there is at least a two-lane section open to traffic by first occupancy permit. As such, DTCL recommends that the draft proffer language be revised appropriately.

Applicant's Response (August 16, 2013): The proffers have been revised to bond construction of the two-lane section of Crosstrail prior to the issuance of the first residential zoning permit for the Property and have the road open to traffic prior to the issuance of the 289th residential occupancy permit. The Applicant will provide adequate access to the homes it builds. Please see Proffer IV.A.2.

Comment Status: DTCL requests the Applicant to clarify the phasing of the development, i.e., identify in which landbays the initial 289 units will be built. This will present a clear picture regarding the construction of particular segments of Crosstrail Boulevard.

- b) **Initial Staff Comment (1st Referral):** Turn lanes along Crosstrail Boulevard at all future intersections on site. OTS recommends that the plat be revised to depict the same.

Applicant's Response (March 5, 2013): Turn lanes will be provided where warranted.

Comment Status (2nd referral): Per the 2010 CTP, Crosstrail Boulevard is a major collector with turn lanes required at all intersections. As such, the Applicant should commit to construct the aforementioned turn lanes at all site intersections.

Applicant's Response (August 16, 2013): Proffer IV.A.2 has been revised to address this comment as requested.

Comment Status: Comment addressed.

- c) **Initial Staff Comment (1st Referral):** Signal at the future intersection of Crosstrail Boulevard and Trailview Boulevard. The Applicant's traffic study assumes this signal to be in place. As such, the Applicant should commit to install the signal, or alternately provide cash-in-lieu contribution, if already constructed by others.

Applicant's Response (March 5, 2013): A traffic signal is not required for build-out of the project. The need for the signal is therefore related to background conditions. With that said, the project would benefit from controlled access and project is willing to contribute its fair share when warranted. See proffer IV.C.

Comment Status (2nd Referral): As per draft proffers IV. D. the Applicant has committed to conduct a signal warrant analysis. DTIC further recommends that if warranted, the Applicant commit to installing the signal, as per the 1st referral comments, or alternately provide cash-in-lieu contribution, if already constructed by others.

Applicant's Response (August 16, 2013): The proffers have been revised to include funding for the signal. Please see Proffer IV.A.5.

Comment Status: DTIC recommends that the Applicant commit to conducting the second signal warrant analysis at the request of the County or VDOT at any time prior to the issuance of the 500th residential occupancy permit, and provide a cash-in-lieu amount of \$300,000 (instead of the \$75,000 as per draft proffer IV.A.5) that will be used towards installing a signal when warranted.

- d) Initial Staff Comment (1st Referral): Bicycle and pedestrian facilities along Crosstrail Boulevard within the site. Appendix 6 of the 2010 CTP calls for two 10-foot wide shared use paths along six-lane roadways. As such, the Applicant should construct the necessary bicycle and pedestrian facilities along Crosstrail Boulevard in such a manner so as to tie-in to the existing facilities. OTS also recommends that the Applicant revise the plat to depict the same.

Applicant's Response (March 5, 2013): The CDP has been revised to include a multi-use trail path on Crosstrail Boulevard.

Comment Status: Comment previously addressed.

- e) Initial Staff Comment (1st Referral): Bridge over the Washington and Old Dominion (W&OD) Trail. As depicted in the Applicant's rezoning plat, Crosstrail Boulevard will cross over the W&OD trail. As such, OTS recommends that the Applicant construct a two-lane section (ultimate westbound lanes) of the bridge over the trail.

Applicant's Response (March 5, 2013): The proffered 2-lane section of Crosstrail will include a bridge over the W&OD Trail.

Comment Status (2nd Referral): Comment addressed contingent upon addition of suitable language in the proffer statement.

Applicant's Response (August 16, 2013): Proffer V.B has been added to address connections to the W&OD trail.

Comment Status: DTIC recommends that the Applicant clarify the language in draft proffer IV.A.2 and draft proffer V.B. to state whether they are committing to construct the ultimate eastbound or westbound lanes (and any associated structures) of Crosstrail Boulevard. Previous discussions between the Applicant

and DTCI indicated that the Applicant would construct the ultimate westbound lanes.

- f) Initial Staff Comment (1st Referral): The Applicant should ensure that its proposed site entrances are coordinated with the County's current design work for Segment B of Crosstrail Boulevard, as well as with the ROW reservation for Trailview Boulevard east of Crosstrail Boulevard (per ESMT 2010-0055).

Applicant's Response (March 5, 2013): Acknowledged.

Comment Status: Comment previously addressed.

4. Initial Staff Comment (1st Referral): As per the 2003 Bike & Ped Plan (Chapter 4, Walkways & Sidewalks Policy 2a), all local/secondary roads are to have sidewalks on both sides. The Applicant should revise the plat to depict the proposed internal street network along with the bicycle and pedestrian facilities along all internal roadways.

Applicant's Response (March 5, 2013): Note 20 has been revised to state sidewalks will be provided on both sides of streets as requested/required.

Comment Status: Comment previously addressed.

5. Initial Staff Comment (1st Referral): The 2010 CTP (Chapter 3, Transportation Demand Management (TDM) Policy #1) calls for land development applications to identify and provide appropriate TDM strategies to reduce the overall number of vehicular trips. Contributions towards the Transit/Rideshare Trust Fund are listed as one of the strategies in the CTP. As such, OTS recommends that the Applicant provide a transit contribution amounting to \$625 per unit.

Applicant's Response (March 5, 2013): The recommended contribution is provided in Proffer IV.E.

Comment Status: Comment previously addressed.

6. Initial Staff Comment (1st Referral): The application proposes residential development adjacent to the planned Crosstrail Boulevard, which is classified as a major collector per the 2010 CTP. The 2010 CTP (Chapter 7, Noise Policy #1) states that such residential developments will be designed to ensure that they will not experience adverse traffic noise impacts. As such, the Applicant should commit to conduct a noise study, as per the requirements stated in the aforementioned policy, to determine the predicted highway noise levels, assess noise impacts, and determine appropriate mitigation measures.

Applicant's Response (March 5, 2013): The Applicant has included a proffer regarding the requested noise study.

Comment Status: Comment previously addressed.

7. Initial Staff Comment (2nd Referral): As per draft proffer V.A., the Applicant has sought a credit for the percentage of the proffered Crosstrail Boulevard construction costs, including right-of-way, attributable to non-Tuscarora Crossing traffic. DTIC does not recommend any credit for the right-of-way needed to construct Crosstrail Boulevard and recommends that any such language be removed from the draft proffer statement. However, DTIC may be amenable to a partial credit for the construction costs of Crosstrail Boulevard and recommends that the Applicant provide a preliminary construction cost estimate for staff review.

Applicant's Response (August 16, 2013): The Applicant respectfully disagrees that it should be solely responsible for providing the full right-of-way for Crosstrail Boulevard. The Applicant has proffered to construct, and provide the right-of-way, for two lanes. Proffer VI.A.1 estimates the right-of-way costs for the portion of the road it will reserve, for construction by others, is \$11.61 million and therefore requests a reduction to its capital facility contribution by that amount.

Comment Status: DTIC continues to recommend against any capital facilities credit in exchange for the provision of right-of-way for future Crosstrail Boulevard through the site, and notes that Sections 1242.02 and 1245.05 of the Land Subdivision and Development Ordinance (LSDO) require dedication of right-of-way to accommodate planned roads, including those shown on the Countywide Transportation Plan (CTP). As to the Applicant's claim that it should not be solely responsible for the provision of the right-of-way for Crosstrail Boulevard, DTIC staff notes that the location of this roadway has been shown to be entirely on this property since at least 1991 with the approval of a subdivision exception (SBEX 1990-0004) on the site, and that DTIC staff recently coordinated the preliminary design of the entire roadway, including site entrance locations, with the Applicant.

Regarding the Applicant's proposed capital facilities credit for construction of two lanes of Crosstrail Boulevard, the Applicant has not provided the requested cost estimate. However, construction of two lanes of Crosstrail Boulevard is necessary to access the site, and DTIC therefore does not recommend credit for such construction as proposed in draft proffer IV.A.1. Given the required transitions between the existing roadway at Russell Branch Parkway and the half-section (ultimate westbound lanes) proposed by the Applicant, DTIC staff understands that the entire (four-lane) bridge over Tuscarora Creek would need to be constructed at the time that the ultimate westbound lanes are built through the site. As such, DTIC would be amenable to providing credit for a portion of this bridge construction.

8. Initial Staff Comment (2nd Referral): DTIC recommends that the Applicant revise the draft proffer language IV.A.1 to provide the necessary on-site ROW for construction of Crosstrail Boulevard along with all the required turn lanes, trails and sidewalks. The Applicant should also commit to provide necessary on-site easements needed to facilitate construction of Crosstrail Boulevard by the County.

Applicant's Response (August 16, 2013): Proffer IV.A.1 has been revised to provide all needed on-site right-of-way for the 120-foot section of Crosstrail. Proffer IV.A.3 provides that same right-of-way should the County build the road.

Comment Status: **Comment addressed.**

9. Initial Staff Comment (2nd Referral): The 2010 CTP (Chapter 2, Traffic Calming Policy #3) states that developers place emphasis on making streets less desirable for speeding and cut-through traffic. Based on the new information provided in the plat (Sheet 4 – Illustrative Plan), DTIC recommends that the Applicant adhere to the aforementioned policy and commit to implement the necessary traffic calming measures during the development process.

Applicant's Response (August 16, 2013): The applicant will proffer to review locally designated streets during the development process to encourage appropriate roadway speeds and function based on roadway classification and VDOT road criteria.

Comment Status: **Comment addressed. DTIC refers the Applicant to the VDOT Traffic Calming Guide for Local Residential Streets for further direction.**

10. Initial Staff Comment (2nd Referral): DTIC recommends that the Applicant proffer to install a bus shelter as per the standards outlined in Chapter 3 of the 2010 CTP. In addition, per the 2010 CTP (Chapter 3, Bus Shelters and Amenities Policies, Policy #4 and #5), the Applicant should agree to maintain the shelter including lighting and trash removal. This shelter should be consistent with the County's standard (non-proprietary) design and will be installed at a future time when public bus route(s) serves this corridor. The final location of the shelter is to be determined in consultation with DTIC staff.

Applicant's Response (August 16, 2013): A proffer has been added that requires provision of a bus shelter along Crosstrail Boulevard. The desired location is shown at the primary entrance to Land Bay 1.

Comment Status: **DTIC notes that the referenced proffer is not included in the August 16, 2013 draft proffer statement. Furthermore, the language on the plat should reflect the installation of a bus shelter (as opposed to a bus stop, as it currently does).**

New Comments

The following new comments are noted based on review of the materials provided to DTIC with this third referral or other new information:

11. As per the revised traffic study, under the 2028 conditions with development, intersection #9 is stop controlled and the eastbound left-turn movement in the AM peak hour has a LOS F (Figure 6-4). Subsequently, Table 6-1 shows that under the 2028 conditions with development and improvements, the same movement has an LOS E in the AM peak hour.

DTCI requests the Applicant to clarify what improvements are causing the level of service to improve from F to E. Notwithstanding that, the 2010 CTP (*Chapter 2, LOS Standards Policies*) states that land development will only occur along roads or near affected intersections that currently function at LOS D, or which are forecast to be improved to LOS D as part of the application being considered. As such, the Applicant should commit to making necessary improvements. DTCI also acknowledges draft proffer IV.A.6, where the Applicant commits to conducting a traffic signal warrant analysis and subsequently construct a signal if warranted at the intersection of Crosstrail Boulevard and Land Bay 3. DTCI requests further clarification as to whether this draft proffer includes signalization of both intersections #8 and #9. If so, the traffic study should be revised to analyze both intersections under signalized conditions.

12. DTCI defers to the Department of Building and Development and the County Attorney's office regarding the Applicant's obligation to construct Trailview Boulevard east of Crosstrail Boulevard, per SBEX 2009-0001, Fricols Subdivision.

Conclusion

DTCI has no overall recommendation on this application at this time. DTCI staff will provide a recommendation after it has reviewed the Applicant's responses to the comments noted in this referral. Depending on the Applicant's responses, DTCI may have additional comments. DTCI staff is available to meet with the Applicant and discuss the comments noted in this referral.

ATTACHMENTS

1. Site Generated Peak Hour Traffic Forecasts – 2018, Figure 5-1
2. Site Generated Peak Hour Traffic Forecasts – 2028, Figure 5-2
3. Future Peak Hour Traffic Forecasts with Development – 2018, Figure 6-1
4. Future Peak Hour Traffic Forecasts with Development – 2028, Figure 6-2
5. 2018 Intersection Levels of Service with Development, Figure 6-3
6. 2028 Intersection Levels of Service with Development, Figure 6-4
7. Future with Development Intersection Level of Service and Queues, Table 6-1

cc: Kathleen Leidich, Assistant Director, DTCI
Lou Mosurak, Senior Coordinator, DTCI
Mike Seigfried, Assistant Director for Land Subdivision, B&D

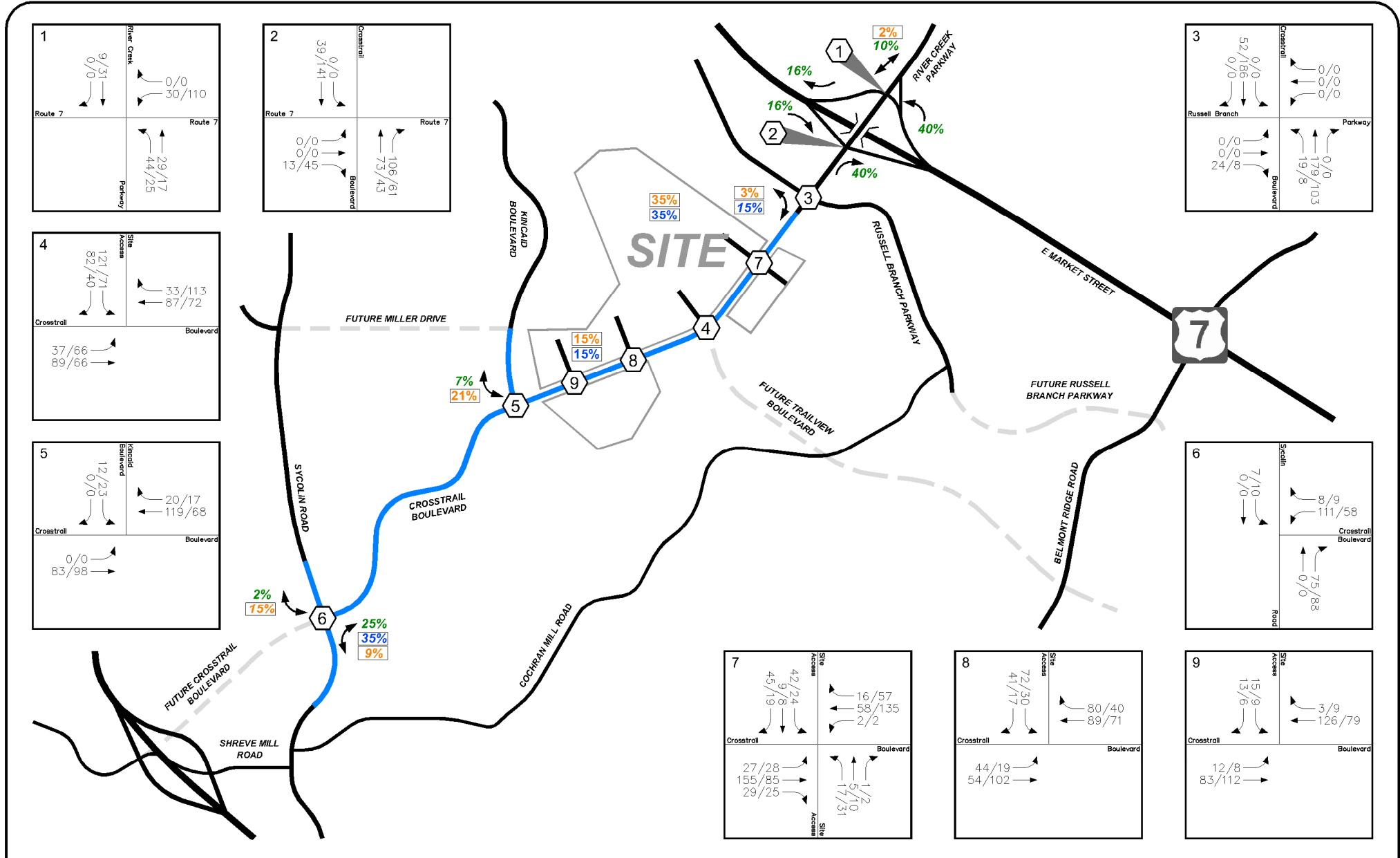


Figure 5-1
Site Generated Peak Hour Traffic Forecasts - 2018

Planned Roadways
XX% Residential Trip Percentage
XX% School Trip Percentage
XX% Retail Trip Percentage
 Local Trips

AM PEAK HOUR
 PM PEAK HOUR
 000/000



ATTACHMENT 1

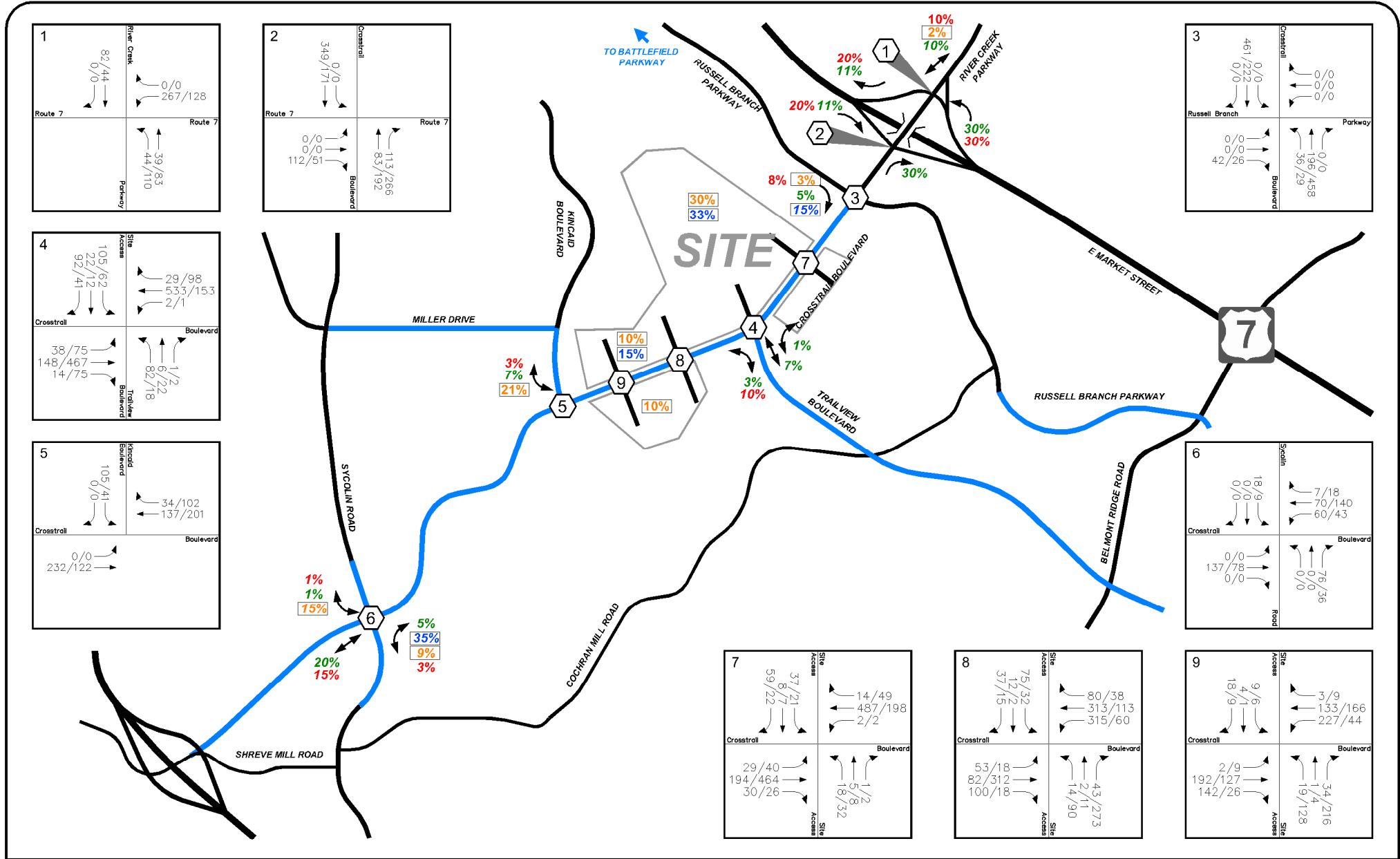


Figure 5-2
Site Generated Peak Hour Traffic Forecasts - 2028

ATTACHMENT 2

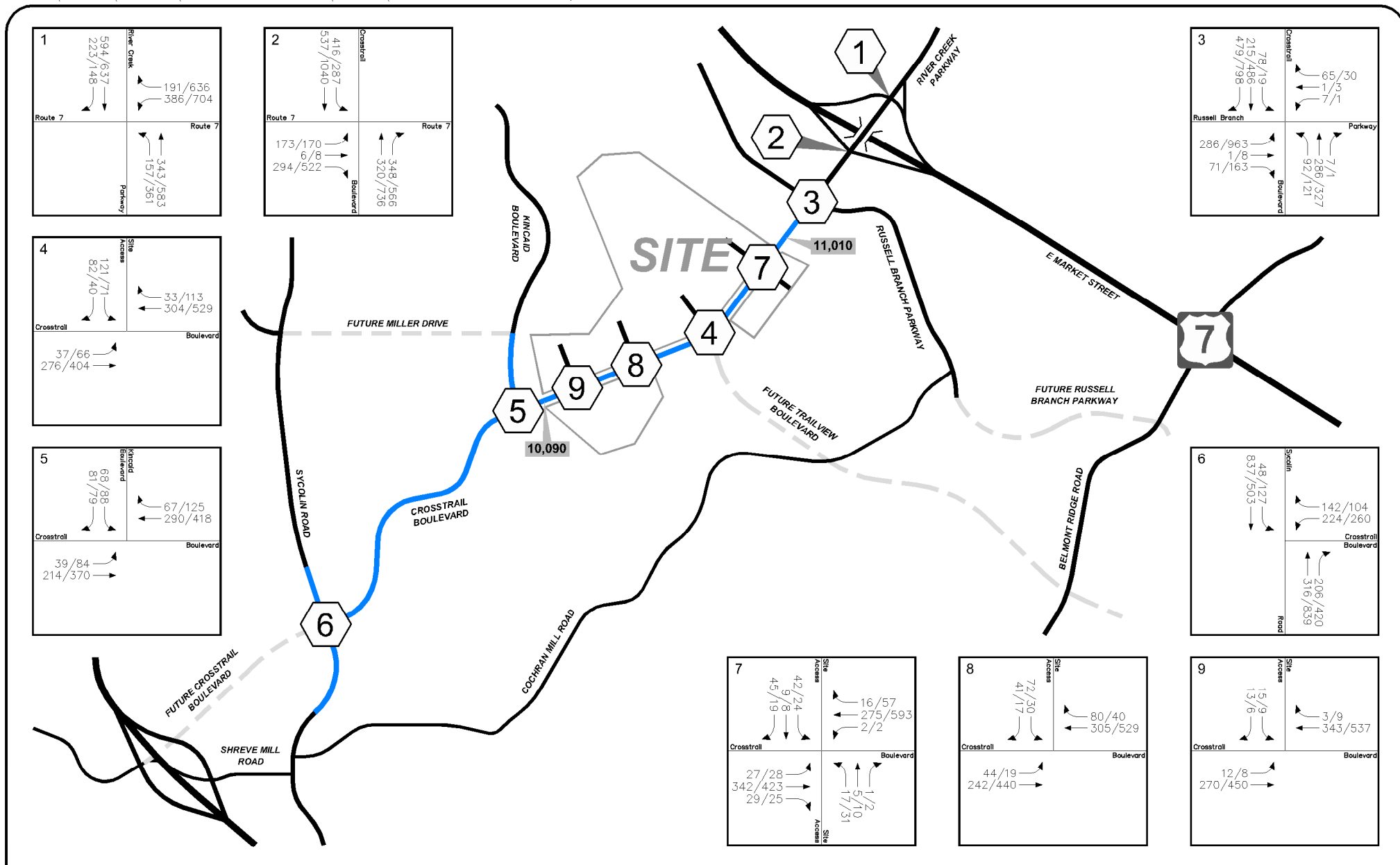


Figure 6-1
Future Peak Hour Traffic Forecasts with Development – 2018

ATTACHMENT 3

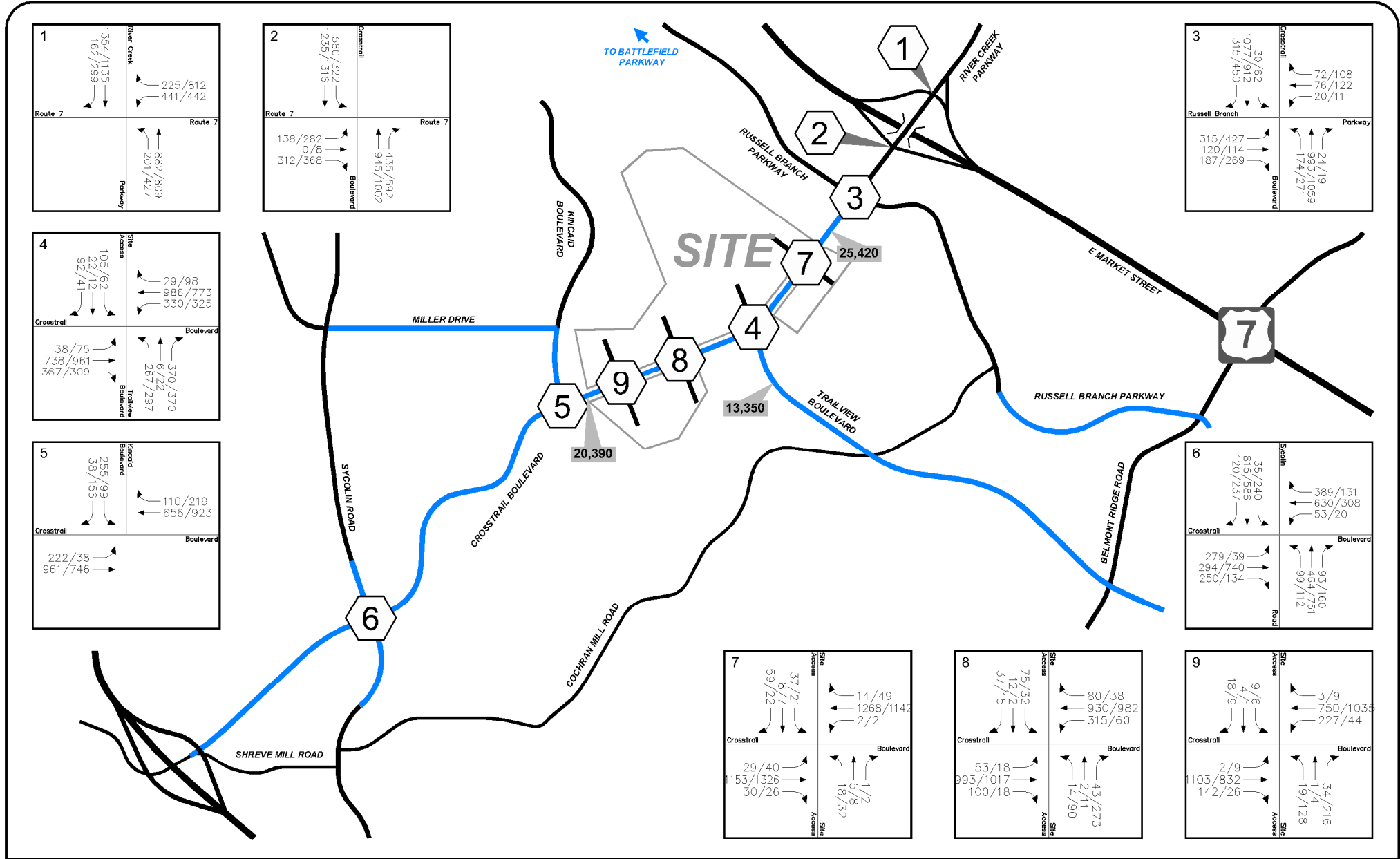


Figure 6-2
Future Peak Hour Traffic Forecasts with Development – 2028

ATTACHMENT 4

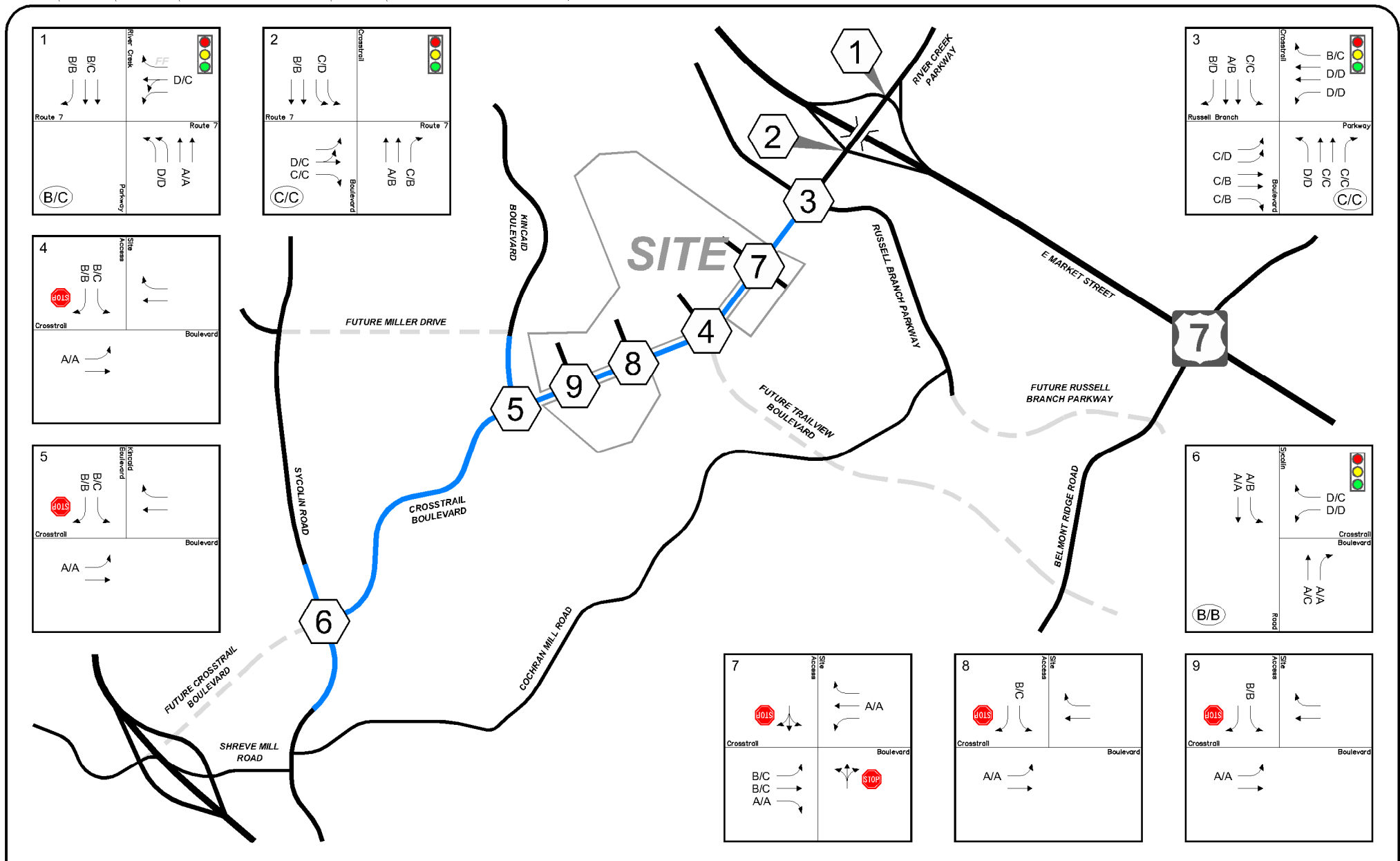


Figure 6-3
2018 Intersection Levels of Service with Development

ATTACHMENT 5

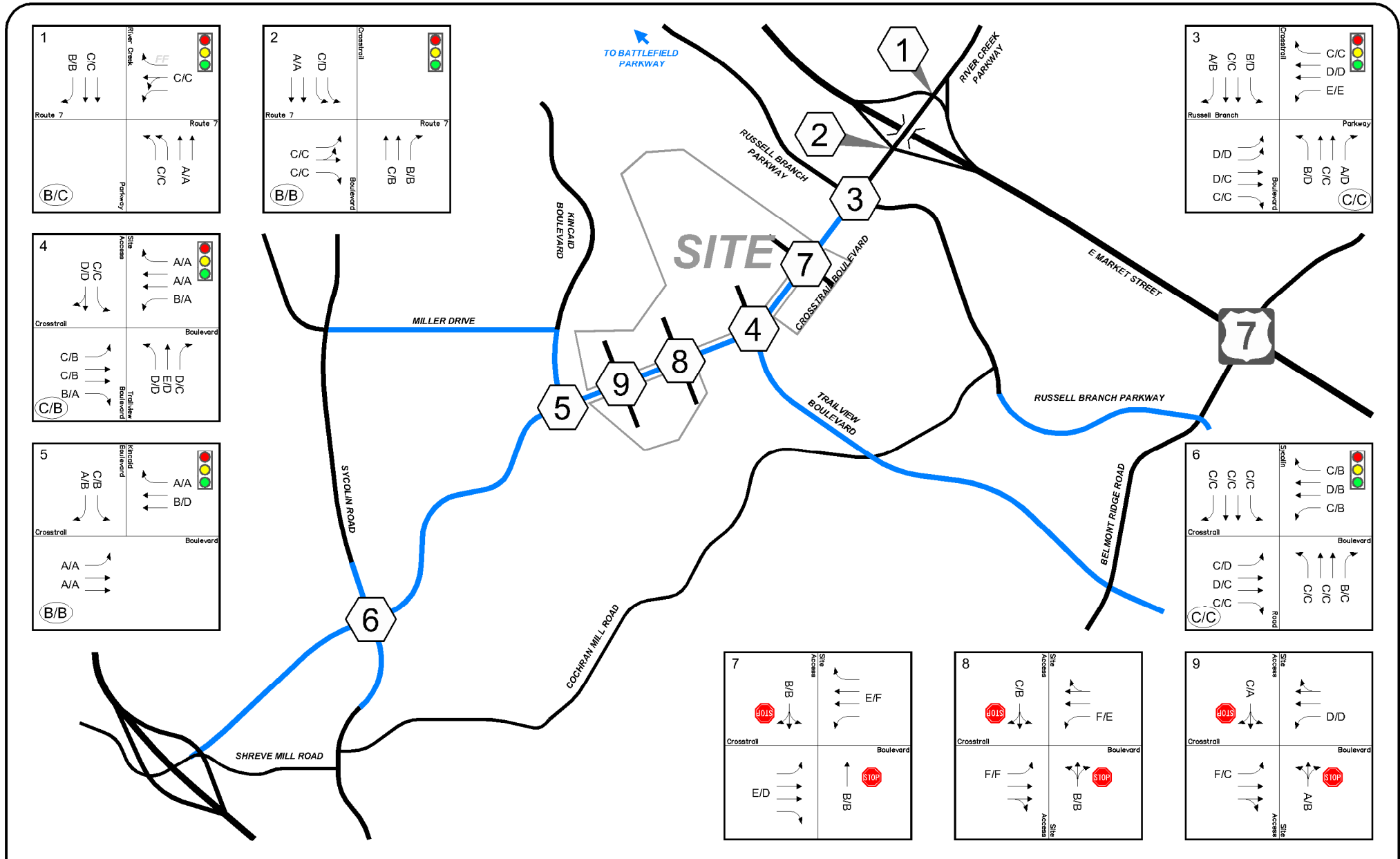


Figure 6-4
2028 Intersection Levels of Service with Development

ATTACHMENT 6

Table 6-1

Tuscarora Crossing

Future with Development Intersection Levels of Service and Queues

| | | Future 2018 with Development | | | | | | | | | | Future 2028 with Development | | | | | | | | | | Future 2028 with Development and Improvements | | | | | | | |
|--|---------|---|---|---|--|--|--|-------|--------------|---|---|--|--|--|---|--------|---|---|--|--|--|--|---|--------------|----|--|--|--|--|
| Intersection | Control | Movement | Storage | AM | | | PM | | | Control | Movement | Storage | AM | | | PM | | | Control | Movement | Storage | AM | | | PM | | | | |
| | | | | LOS | Delay | 95th % Queue | LOS | Delay | 95th % Queue | | | | LOS | Delay | 95th % Queue | LOS | Delay | 95th % Queue | | | | LOS | Delay | 95th % Queue | | | | | |
| 1. Route 7 Westbound On/Off Ramp & River Creek Parkway | Signal | WBLT NBL NBT SBT SBR Overall | - 250 - - - B | D (35.5) D (37.9) A (6.8) B (11.4) B (10.1) B (18.2) | 134 72 63 140 33 33 | C (33.0) D (38.5) A (1.9) C (21.9) B (17.6) C (22.5) | 226 105 16 206 38 38 | | Signal | WBLT NBL NBT SBT SBR Overall | - 250 - - - B | C (35.0) C (33.7) A (4.9) C (21.1) B (11.1) B (18.7) | 147 55 33 #507 33 33 | C (34.8) C (28.6) A (7.9) C (24.6) B (16.0) C (21.4) | 147 153 212 #461 67 67 | | Signal | WBLT NBL NBT SBT SBR Overall | - 250 - - - B | C (35.0) C (34.9) A (4.4) C (21.1) B (11.1) B (18.7) | 147 59 33 #507 33 33 | C (34.8) C (27.2) A (5.3) C (24.6) B (16.0) C (20.6) | 147 129 154 #461 67 67 | | | | | | |
| 2. Route 7 Eastbound On/Off Ramp & Crosstrail Boulevard | Signal | EBLT EBR NBT NBR SBL SBT Overall | - 400 - - 500 - B | D (37.4) C (20.1) A (6.8) C (20.0) C (33.2) B (13.8) C (20.5) | 72 173 67 79 134 108 383 | C (25.1) C (30.6) B (16.0) B (14.7) D (38.1) B (17.3) C (20.8) | 50 343 m265 m289 105 383 383 | | Signal | EBLT EBR NBT NBR SBL SBT Overall | - 400 - - 500 - A | C (33.0) C (25.4) C (21.0) B (16.7) C (25.2) A (9.3) B (18.0) | 47 197 #435 69 m153 345 345 | C (32.3) C (29.6) B (15.6) B (14.1) D (43.5) A (7.5) B (17.5) | 96 266 261 48 m#131 21 21 | | Signal | EBLT EBR NBT NBR SBL SBT Overall | - 400 - - 500 - A | C (33.0) C (25.4) C (21.0) B (16.7) C (25.1) A (9.2) B (17.9) | 47 197 #435 69 m155 344 344 | C (32.3) C (29.6) B (15.6) B (14.1) D (38.1) A (8.8) B (17.5) | 96 266 261 48 m#131 310 310 | | | | | | |
| 3. Russell Branch Parkway & Crosstrail Boulevard | Signal | EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL SBT SBR Overall | 400 - 200 250 - 200 350 - - 350 350 - 350 | C (34.5) C (25.5) C (25.9) D (44.1) D (42.6) B (12.6) D (36.5) C (34.9) C (31.0) B (20.0) A (9.1) B (12.5) C (22.6) | 102 1 24 16 2 11 82 100 9 75 61 38 341 | D (36.3) B (15.6) B (16.5) D (43.0) D (43.0) C (24.0) D (50.7) C (33.2) C (31.9) C (20.2) B (10.5) D (37.0) C (31.1) | #375 5 38 5 4 18 #128 116 m2 m1 97 341 341 | | Signal | EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL SBT SBR Overall | 400 - 200 250 - 200 350 - - 350 350 - 350 | D (49.9) D (40.6) C (30.6) E (59.3) D (53.3) C (28.1) C (31.2) C (27.2) A (5.3) B (11.9) C (22.4) A (7.2) C (27.4) | 150 61 98 40 51 43 73 73 A (0.1) D (36.3) C (34.1) B (14.3) C (28.0) | 191 52 112 27 73 54 m#252 214 41 385 59 59 | | Signal | EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL SBT SBR Overall | 400 - 200 250 - 200 350 - - 350 350 - 350 | D (49.9) D (40.6) C (30.6) E (59.3) D (53.3) C (28.1) C (28.9) C (21.6) A (6.8) B (11.9) C (22.4) A (7.2) C (25.6) | 150 61 98 40 51 43 110 148 20 438 28 28 | D (47.2) C (32.4) C (21.2) E (59.5) D (50.2) C (33.9) C (30.1) B (15.6) D (36.3) C (34.1) B (14.3) C (27.3) | 191 52 112 27 73 54 m#248 106 41 385 59 59 | | | | | | | |
| 4. Trail View Boulevard (2028)/ North Mid Site Driveway & Crosstrail Boulevard | Stop | EBL EBT WBL | - - - | B [14.9] B [10.8] A [8.1] | 23 9 2 | C [18.9] B [12.6] A [9.4] | 19 6 6 | | Signal | EBL EBT WBL WBT WBR NBL NBT NBR SBL SBT SBR Overall | - - 250 - 200 225 - 225 200 - 200 200 | C (29.3) D (49.0) D (50.8) E (55.7) D (36.5) C (22.9) D (36.8) B (15.8) C (31.5) A (8.4) A (0.2) C (26.4) | 94 67 229 16 120 25 #346 44 206 82 m0 m0 | C (34.4) D (53.4) D (44.6) D (52.7) C (31.6) B (14.0) C (27.5) A (1.3) C (31.9) D (6.5) A (1.2) C (22.2) | 62 45 262 38 50 31 #517 3 158 107 m0 m0 | | Signal | EBL EBT WBL WBT WBR NBL NBT NBR SBL SBT SBR Overall | - - 250 - 200 225 - 200 200 | C (29.3) D (49.0) D (50.8) E (55.7) D (36.5) C (22.9) D (36.8) B (15.8) C (31.5) A (8.4) A (0.2) C (26.4) | 94 67 229 16 120 25 #346 44 206 82 m0 m0 | C (34.4) D (53.4) D (44.6) D (52.7) C (31.6) B (14.0) C (28.0) A (8.7) C (24.1) D (8.9) A (3.6) C (22.9) | 62 45 262 38 50 31 #520 3 140 192 m7 m7 | | | | | | |
| 5. Kincaid Boulevard Crosstrail Boulevard | Stop | EBL EBR NBL | - - - | B [13.0] B [10.6] A [8.2] | 11 9 2 | C [18.5] B [11.9] A [9.0] | 23 11 7 | | Signal | EBL EBR NBL NBT SBT SBR Overall | - - 250 - 250 250 | C (23.0) A (8.7) A (7.6) A (6.9) B (19.0) A (5.7) B (12.3) | 184 12 76 167 198 14 14 | C (20.4) B (14.9) A (8.8) A (5.6) C (33.4) A (0.1) B (18.2) | 93 64 m5 27 333 m0 18.2 | | Signal | EBL EBR NBL NBT SBT SBR Overall | - - 250 - 250 250 | C (23.0) A (8.7) A (7.6) A (6.9) B (19.0) A (5.7) B (12.3) | 184 12 76 167 198 14 14 | C (20.4) B (14.9) A (8.8) A (5.6) C (32.2) A (0.9) B (17.3) | 93 64 m5 29 307 0 17.3 | | | | | | |
| 6. Crosstrail Boulevard Sycolin Road | Signal | WBL WBR NBT NBR SBL SBT Overall | - 250 - 250 250 - A | D (46.2) D (39.4) A (7.9) A (1.8) A (3.7) A (8.8) B (14.9) | #213 52 119 7 14 314 314 | D (52.6) C (31.3) C (20.1) A (2.7) B (14.5) A (5.7) B (17.6) | #263 43 496 17 34 134 134 | | Signal | EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL SBT SBR Overall | 250 - 250 250 - 250 250 - 250 250 250 - 250 | C (25.1) D (45.4) B (18.6) C (27.6) C (32.5) C (23.2) C (27.1) C (23.0) B (17.9) C (23.5) D (36.5) C (29.6) C (32.6) | 33 368 27 74 183 28 194 107 86 42 285 250 39 | D (39.1) C (31.9) C (24.3) B (14.3) C (21.7) B (11.0) C (22.9) C (31.0) C (24.3) C (32.9) C (25.3) C (24.2) C (26.6) | 201 227 30 22 336 44 37 302 40 23 119 39 39 | | Signal | EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL SBT SBR Overall | 250 - 250 250 - 250 250 - 250 250 250 - 250 | C (25.1) D (45.4) B (18.6) C (27.6) C (32.5) C (23.2) C (27.1) C (23.0) B (17.9) C (23.5) D (36.5) C (29.6) C (32.6) | 33 368 27 74 183 28 194 107 86 42 285 250 39 | D (39.1) C (31.9) C (24.3) B (14.3) C (22.2) B (17.5) C (22.9) C (31.0) C (24.3) C (32.9) C (25.3) C (24.2) C (27.0) | 201 227 30 22 336 44 37 302 40 23 119 39 39 | | | | | | |
| 7. North Site Driveway (Retail) Crosstrail Boulevard | Stop | EBLTR WBLTR NBL SBL | - - - - | B [13.3] B [14.4] A [8.0] A [8.1] | 16 4 2 0 | C [17.6] C [20.5] A [9.2] A [8.4] | 13 13 2 0 | | Stop | EBLTR WBLTR NBL SBL | - - - - | E [46.3] E [43.1] B [12.9] B [10.9] | 70 17 5 0 | D [31.7] F [54.6] B [12.4] B [11.7] | 25 36 6 0 | | Stop | EBLTR WBLTR NBL SBL | - - - - | E [46.3] E [43.1] B [12.9] B [10.9] | 70 17 5 0 | D [31.7] F [54.6] B [12.4] B [11.7] | 25 36 6 0 | | | | | | |
| 8. South Mid Site Driveway Crosstrail Boulevard | Stop | EBLTR NBL | - - | B [13.7] A [8.3] | 19 3 | C [15.3] A [8.8] | 10 1 | | Stop | EBLTR WBLTR NBL SBL | - - - - | F * F * B [11.3] C [19.6] | Err Err 7 83 | F [103.6] E [46.9] B [10.9] B [11.5] | 65 188 2 8 | | Signal | EBLTR WBLTR WBLR NBL NBTR SBL SBTR Overall | - - - - - - - - | D (46.4) D (39.2) C (22.4) B (12.2) C (24.1) D (41.1) A (9.3) C (21.4) | 129 28 21 19 434 m243 258 258 | D (40.6) D (46.1) D (39.3) A (4.3) A (5.3) A (3.3) A (4.7) B (10.9) | 54 117 224 6 102 m9 128 128 | | | | | | |
| 9. South Site Driveway Crosstrail Boulevard | Stop | EBLTR NBL | - - | B [11.6] A [8.1] | 4 1 | B [14.0] A [8.7] | 3 1 | | Stop | EBLTR WBLTR NBL SBL | - - - - | F [117.7] D [28.7] A [9.5] C [16.5] | 48 21 0 50 | C [21.8] D [26.5] B [11.0] A [9.5] | 5 115 1 4 | | Stop | EBLTR WBLTR NBL SBL | - - - - | E [45.5] C [23.0] A [9.0] C [16.5] | 23 15 0 50 | C [16.1] C [16.4] B [10.3] A [9.5] | 4 54 1 4 | | | | | | |

Notes:

1. Analysis performed using Synchro software, version 7
2. # 95th percentile volume exceeds capacity, queue may be longer.
3. Queue shown is maximum after two cycles.
4. m Volume for 95th percentile queue is metered by upstream signal.
5. North-south streets are labeled in BOLD